

Work Order ID 133782 -1

133782

June-17-15 2:47:24 PM

Page 1

Item ID: D6020-160

Accept

N900040100

Setup Start *NS1*

Revision ID:

Stop *NS2*

Item Name: Crosstube Material

Start Date: 6/17/15 Start Qty: 21.00

21

Cust Item ID:

Required Date: 12/21/15 Req'd Qty: 21.00

21

Customer:

Reference:

Approvals:

Process Plan: W

Date:

Tooling:

Date:

Run Start *NR1*

QC:

Date:

SPC (Y/N):

Date:

Stop *NR2*

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
Draw Nbr	Revision Nbr								
D6020	pa3								

110

110

PURCHASING

0.00

Purchasing

Memo

0.00

Purchasing

Issue P/O:

Manufacture as per dwg D6020

u 15-06-17 21

120

120

Receive & Inspect for Damage & Mat'l Certs

0.00

Packaging

Memo

0.00

Packaging

Ensure material certification is attached

2x SP 16-01-20

130

130

QC6- Inspect dimensions to drawing

0.00

QC

Memo

0.00

Quality Control

Ensure Material certification comply to Dwg

(2)

DAS
38
9-89

JAN 25 2016

Work Order ID 133782

133782

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Item ID: D6020-160 Accept *N9000040100* Setup Start *NS1*
 Revision ID: Stop *NS2*
 Item Name: Crosstube Material
 Start Date: 6/17/15 Start Qty: 21.00 *21* Cust Item ID:
 Required Date: 12/21/15 Req'd Qty: 21.00 *21* Customer:
 Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____ Run Start *NR1*
 QC: _____ Date: _____ SPC (Y/N): _____ Date: _____ Stop *NR2*

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
190	Identify as per dwg & Stock Location: <u>Shed</u>	0.00							
100	Memo	0.00							
Packaging									
Packaging									
	Tubes Not Identified, CRATE Identified								
200	QC21- Final Inspection - Work Order Release	0.00							
200	Memo	0.00							
QC									
Quality Control									

16-11-17

16/11/21

16-11-17

Picklist Print

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Page 1

Work Order ID: 133782

133782

Parent Item: D6020-160

D6020-160

Parent Item Name: Crosstube Material

Start Date: 6/17/15

Required Date: 12/21/15

Start Qty: 21.00

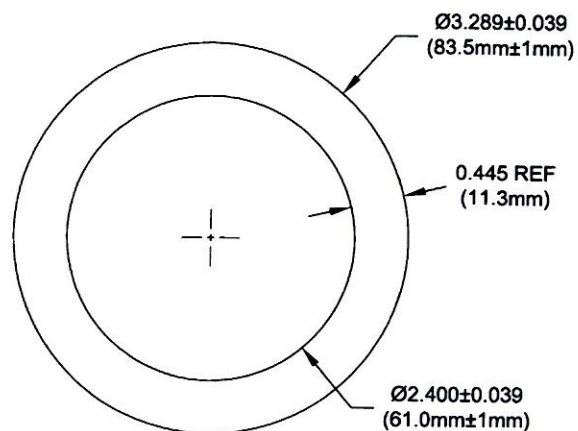
Required Qty: 21.00

Comments: IPP REV:A 13.03.06 NEW ISSUE DD VERF:JLM

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
D6020-160P		Purchased	No				Each	0.0000		21			
D6020-160P									**	21			
Crosstube Material													

2x
2x SP 16-01-20

SPECIFICATION CONTROL DRAWING



NOTES

1) D6020-XXX CROSSTUBE

LENGTH

WHERE XXX IS LENGTH IN INCHES
EG. 160" LONG TUBE: D6020-160

2) MATERIAL: 17-4PH SEAMLESS STAINLESS STEEL TUBE PER ASTM A564
Ø3.289 O.D. x Ø2.400 I.D.

HEAT TREAT TO H1025 CONDITION (HRC 34-42):
MIN. ULTIMATE TENSILE STRENGTH = 155 ksi
MIN. YIELD TENSILE STRENGTH = 145 ksi

3) TOLERANCES ARE AS FOLLOWS:

ECCENTRICITY: 15% (+/-0.066" WALL)

LENGTH: XXX +0.188"/-0.000"

STRAIGHTNESS: 0.012" DEVIATION / 12" LENGTH

4) ALL DIMENSIONS ARE IN INCHES

5) TUBE MUST BE PICKLED OR ELECTROPOLISHED TO BE SMOOTH AND FREE FROM SCALE.

6) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.

W/O 133782

RELEASED
2013-08-14

REV.	NEW ISSUE	DESCRIPTION	CP	13.04.24
DESIGN			BY	DATE
DRAWN				
CHECKED				
MFG. APPR.				
APPROVED				
DE APPR.				
DATE	13.04.24			

DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA		REV. A
DRAWING NO.	D6020	SHEET 1 OF 1
TITLE	CROSSTUBE MATERIAL	SCALE
DATE		NTS

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Dart Aerospace Ltd.
1270 Aberdeen Street
Hawkesbury, ON K6A 1K7
Tel: 613 632 9577
Fax: 613 632 1053

PURCHASE ORDER

Purchase Order ID **PO28800**

Purchase Order Date 6/12/15

PO Print Date 6/17/15

Page Number 2 of 2

Order From :

VU-THI01

Ship To : DART AEROSPACE LTD

TUBE HOLLOW INTERNATIONAL
39 ENTERPRISE DRIVE SUITE 2

1270 ABERDEEN
HAWKESBURY, ON K6A 1K7
CANADA

WINDHAM, MAINE 04062
UNITED STATES

Contact Name

Vendor Phone 207-892-8899

Buyer

Chantal Lavoie

Customer POID

Customer Tax #

10127-2607

Terms

Net 30

Currency

USD

FOB

EXW - (Ex Works)

Ship To Contact

Ship To Phone

Ship Via: Journey Freight collect

Ship Acct:

2	71401-45	PROCUREMENT QUALITY CLAUSES	9/24/15	1.00	✓	\$0.00	\$0.00
---	----------	--------------------------------	---------	------	---	--------	--------

No

9/24/15

Procurement Quality Clauses

A005 RIGHT OF ENTRY

A007 FIRST ARTICLE INSPECTION (FAI) BY SELLER,
(DOCUMENTATION MAINTAINED BY SUPPLIER)

A012 CHEMICAL AND PHYSICAL TEST REPORTS

A016 PERSONNEL QUALIFICATION

A024 PROCESS CERTIFICATIONS

A025 CERTIFICATE OF CONFORMANCE

A040 NOTIFICATION OF QUALITY ESCAPE

A041 QUALITY MANAGEMENT SYSTEM

A042 DART NOTIFICATION BY SUPPLIER

A043 RETENTION OF QUALITY DOCUMENTS

Sp 16-01-20

Line Total:

\$0.00

3	D6020-160P	Crosstube Material	9/24/15	21.00	Recu 2x	\$3,490.50	\$73,300.50
			Yes	Each			
			9/24/15				

as above

Line Total:

\$73,300.50

PO Total:

\$146,601.00

UCL

PO Instructions: PROPOSAL NO: 15150

Note: Terms & Condition of Purchasing(Suppliers) and Procurement Quality Clauses are an integral part of our AS9100 requirements. To learn in detail, please visit www.dartaerospace.com for further explanation.

Change Nbr: 3

Change Date: 6/17/15

PACKING LIST

**TUBE HOLLOWS
INTERNATIONAL**

Packlist ID: 01595
Date: 1/15/2016
Page: 1

39 ENTERPRISE DRIVE
SUITE 2
WINDHAM, ME 04062
PHONE: 207-892-8899 FAX: 207-892-8863

Sold To Address

DART AEROSPACE LTD.
1270 ABERDEEN ST.
HAWKESBURY K6A 1K7
CANADA

Ship To Address

DART AEROSPACE LTD.
1270 ABERDEEN ST.
HAWKESBURY K6A 1K7
CANADA

			CUSTOMER PO		PAYMENT TERMS			F.O.B.	
			28800		Net 30			WINDHAM	
SALES REP ID			SHIPPING METHOD		SHIP DATE			OUR ORDER NUMBER	
EVAN			JOURNEY FREIGHT		1/15/2016			DAR150141	
QUANTITY									
ORD	SHF	BCK	CUSTOMER PART ID	DESCRIPTION					

Rev No:

21.00 2.00 19.00 CROSSTUBE

160" CROSSTUBE
Drawing: D6020-160P
Rev No:
Unit of Measure: EA

2 PIECES OF THI SUPPLIED 17-4 MATERIAL, MACHINED
PER DRAWING# D6024 REV. A.

S/N 29, 30

RE: THI WO# 150624/01

THANK YOU FOR THIS ORDER.

TOLERANCES ARE AS FOLLOWS:
ECCENTRICITY: 15% (+/-0.066" WALL).
LENGTH: XXX +0.188"/0.000".
STRAIGHTNESS: 0.012" DEVIATION / 12" LENGTH.

RECEIVED BY: _____

STATEMENT OF CONFORMANCE

Dart Aerospace Ltd.
1270 Aberdeen
Hawkesbury, ON K6A 1K7

Part #: D6020-160P
Material: 17-4 PH
Report Serial #: See Table below
Heat #: See Table below
Drawing #: D6020 Rev. A
P.O #: PO28800 L/I 3
THI WO#: 150624/01
Qty: 2 ✓

8016-01-20

Material Cert Report Serial Number:	Heat #:	Serial Number:
DNK-0066998-G22508-81369	G22508-NJAGHZ	29, 30

The above-mentioned parts have been inspected and conform to customer contract, purchase order, drawing, and other required specifications. All exceptions are noted below. Inspection data and all certifications are kept on file and available for review upon customer request.

Comments: This is a partial shipment of line item 3 of this PO.
Length of SN 29 – 159.9”, SN 30 – 159.97”

Inspected / Certified By: Christine Plummer

Christine Plummer, Quality Dept. January 15, 2016



LABORATORY
ACCREDITATION
BUREAU
ACCREDITED ISO/IEC 17025

Certificate # L2370 Testing



UNIVERSAL
STAINLESS

Dunkirk Specialty Steel, LLC.

830 Bringham Road | Dunkirk, NY 14048

(716) 366-1000

Material Certification



Accredited

Materials Testing Laboratory
Heat Treating

MILL ORDER: 0066998

PART NUMBER: 72313.BO

P.O. NUMBER: 354505

SERIAL NUMBER: DNK-0066998-G22508-81369

Certificate of Conformance - Part 1 of 2

P.O. DATE: 9/8/2015

Part 1 - PAGE NUMBER: 1 of 1

PRINTED: 12/2/15 11:55

S A. M. CASTLE & CO.
O T 1420 KENSINGTON ROAD
L O SUITE 220
D

OAK BROOK, IL 60523

S A.M. CASTLE & CO.
H T 299 CANAL ROAD
I O
P

FAIRLESS HILLS, PA 19030

Material Description: STAINLESS STEEL ROUND BAR 17-4 EAF+AGD SOLUTION TREATED & AGED COND H1025 ROUGH TURNED ASTM A564-13 (type 630 condition H1025),

Size: 3.5000 DIAM X 160.0000 CUT-TO-LENGTH

Heat Number	TOP	Wt	C	MN	SI	S	P
G22508			0.029	0.70	0.33	<0.001	0.023
			CR 15.31	W <0.05	V 0.09	NI 4.32	MO 0.34
			CO 0.07	CU 3.26	SN 0.010	PB	CB 0.24
			TA <0.01	AL 0.08	TI 0.01	FE	B 0.001
			O	MG	CA	SE	ZR
			AG	BI	N 0.028	H	CQ

HARDNESS: 358 HBW

HARDNESS: 35.4 HRC

TENSILE: DIR. T/S KSI 0.2% Y/S KSI YEL YR/A
LONG. 171.0 166.5 13.98 58.55

MACRO ETCH TEST: ACCEPTABLE

MATERIAL ID: NJAGHZ

THIS MATERIAL WAS SOLUTION TREATED AT A TEMPERATURE OF 1900 °F/1 HR/AC + 1025 °F/4 HRS/AC

/S/ Amy Giordano

/S/ Kevin Seidel

Date: 12/02/15

Prepared by: Amy Giordano

Kevin Seidel, Technical Mgr.

Melted and manufactured in compliance with DFARS 252.225-7009 ALT 1. Melted and chemistry tested by USAP in Bridgeville, PA., USA. Material Manufactured in USA. Certification IAW DIN 50 049/EN 10204 3.1. Material complies with EU directive 2002/95/EC (RoHS). The test results shown are certified to be a correct statement of records that were derived from testing samples of the material. Results meet applicable specifications. No welding was performed on the material supplied on this order. Material is free from mercury contamination. Material is of NAFTA origin. This material was produced under the Dunkirk Specialty Steel Quality Management System documented in QP Manual, Rev. 10 dated 3/11/2015, conforming to NCA-3800. Material testing was performed as applicable in accordance with ASTM A370, A604, E8, E10, E18, E23, E45, E112, E139, E381, E572, E1019, STP-CHEM-GDS, E1444, & AMS 2315. The recording of false, fictitious, or fraudulent statements on this document may be punished as a felony under federal statutes, including Federal Law, Title 18, Chapter 47. Test results are maintained in company records. This certification shall not be produced, except in full, without written approval of Dunkirk Specialty Steel. Material is free from Radioactive Contamination. Safety Data Sheets (SDS) are available at www.univstainless.com. If applicable: Decarb test - furnace atmosphere is Argon; Corrosion Test (ASTM A262 Practice A) - Etchant used -10% Oxalic Acid; Microstructure @ magnification 250 - 500X. Stress Rupture, Bending Test (ASTM 384), and Microcleanliness tests performed by Westmoreland Testing Laboratory or Element Materials Technology. Impact Testing and Corrosion Test (ASTM A262 Practice E) performed by the NSL Testing Laboratory, Westmoreland Testing Lab or Element Materials Technology. Unless otherwise stated, Percentage Elongation is measured in 4D. Speed of Testing: 0.005 in/in/min.; 0.05 in/in/min.

EXTRUSION INSPECTION SHEET



TUBE #	TOTAL LENGTH	SIDE A		SIDE B		Measurement unit		Inches		Symbol		"		ULTRA SONIC MEASUREMENTS				
		DIA		DIA		INSIDE DIA	wall thickness measured w/vern	Strightness at 12" in middle	Rockwell Reading	LOCATION on tube	R1	R2	R3	R4				
		R1	R2	R1	R2													
DWG										N/A	Middle	N/A						
1										N/A	Middle							
2	161-100	3.331	3.328	3.324	3.328	2.373	.478	.475		N/A	Middle	.469	.470	.470	.470			
3	161.0	3.325	3.324	3.324	3.325	2.373	.473	.477		N/A	Middle	.466	.464	.464	.465			
4										N/A	Middle							
5										N/A	Middle							
6										N/A	Middle							
7										N/A	Middle							
8										N/A	Middle							
9										N/A	Middle							
10										N/A	Middle							
11										N/A	Middle							
12										N/A	Middle							
13										N/A	Middle							
14										N/A	Middle							
15										N/A	Middle							
16										N/A	Middle							
PART #		D6020-160				P/O#		28800		BATCH #		133782		Notes:				